

syllabus

mission

It is our premise that in the coming to a professional undergraduate architecture program at Carnegie Mellon University, you have chosen to be educated as architects and not merely to be “exposed” to the study of architecture. You will therefore not only become skilled designers, but also capable of understanding the meanings inherent in two and three dimensional spatial design. You will need to personally develop the capacity to manipulate form and space in order to express your specific intentions but also to develop the professional and technical skills which will make your intentions of becoming architects a reality.

We will focus this semester on the establishment of a fundamental understanding of representation and abstraction to which more of your own thoughts and ideas about spatial thinking can be added. This will involve, by means of the architectural studio, a reiterative investigation into the relationship of technique, form, and meaning through study, invention, testing, and evaluation. This semester a series of short problems will be given to expose you to the complexity of visual communication and the design act; to develop skills of spatial manipulation; to give you the self-confidence in making valid decisions within set time limits; to develop the skills of graphic presentation necessary for interpreting and communicating your architectural intentions; and above all, to instill the ability to combine insight with the rigorous analytical study in a “design process” that is efficient, personally effective, and which becomes second nature to you as a working process.

For most of you, the experiences of being in a school of architecture will be considerably different from your prior academic training. It will challenge your perceptions of yourself and the world with which you are familiar. This is, on one hand, a professional education and there are design skills, technical, historical, hand’s on and ecological knowledge you must master. However, this is also a creative discipline that leaves the ultimate responsibility for design decisions and the ensuring product with the designer. As an education, this is only the beginning of a process that should sustain you for the rest of your professional careers.

Specific goals of the first year design studio are:

to work fluidly between media, tools, methods, and modes of learning
to make connections between courses (knowledge domains)
to set the basis for an interdisciplinary / broad / liberal education

studio

The studio is a place and an environment that includes you, your colleagues, and the faculty. The studio as a place is your first and on-going project. It is the mechanism through which architecture will take life. It is a synthetic environment, which is to say that it draws strength from what is brought to it. It attempts to combine diverse bodies of knowledge, instruction, realms of inquiry, and personal history in a way that allows each member of the studio to contribute towards the learning of the whole. You are both responsible to and will benefit from your colleagues in a way that could not be accomplished alone. When you do not contribute to the environment, you not only lose the good you would have gained for yourself but deprive your colleagues of that same good. When it works, it is the most intense and concentrated experience of discovery you will ever have.

Studio is first a place for work, second a place for mutual discovery, and third a place for discussion and evaluation. Studio activities includes desk crits, pin-ups, reviews, discussions, lectures, shop sessions and demonstrations. Whenever possible, other core first year courses, such as Drawing and Introduction to Digital Media, have been designed to integrate with studio projects to provide students with multiple methods of expressing their design intent. This integration of other course material with studio is something that will continue throughout the next four years of your education.

In the studio your professors and colleagues will assist you in how to begin but only you can assume the final responsibility to learn. Attitude is critical. Design and the studio environment require a climate of humility, a willingness to consider alternatives, and most importantly an ability to be critical of your own work. Perhaps the most difficult part of the studio experience is self-evaluation and its related public counterpart of external critique. Because you invest so much of yourself in the work, you must distance yourself in order to make criticism productive. This is difficult, but it should be something for which you strive. More insight from diverse sources will inform your design process. Shortcomings that remain concealed cannot be fixed. Your own desire to make your work better is essential for the training of an architect.

studio component: sketchbook

A black sketchbook is required of all students and must be filled by the end of the semester. For the journey through first year architecture education, the sketchbook is your most valuable resource. It should capture knowledge and synthesize discoveries from every source – both inside and outside the studio. Critical thought, experimentation, and reflection should generate the content. We expect to find evidence of studio assignment exploration / process, lectures, readings, shop sessions, pin-ups, reviews, desk-crits, and the field trip in your sketchbooks. Make sure you have your sketchbook with you at all times throughout the semester. The sketchbook is a method which we take very seriously. We expect you to treat it with the intensity and rigor required for other aspects of studio. It will be graded.

studio component: lectures

The lecture component of studio introduces the fundamental vocabulary and basic principles of design while presenting examples and strategies for design problem solving. Every student is required to attend and is responsible for material presented in the lectures. These ideas, strategies, and foundations should be tested and evident in studio investigations.

In addition, you are required to attend all School of Architecture lectures this semester, many of which are listed on the calendar, as well as selected School of Art lectures, to be announced throughout the semester.

studio component: shop sessions

The studio will have an explicit relationship to the woodshop, which is directed by Scott Smith and his assistant, Brian Miller. Woodshop emphasis is placed on the formal manipulation of wood based on studio themes. You will be required to attend six one-hour safety & skills workshops and use the woodshop as part of the studio. However, the woodshop is also a privilege that carries responsibility for tool return, clean up, and general consideration for the rest of the students, both in the first years and the other years of the program.

studio component: field trip

There will be one field trip during the semester which is intended to introduce you to Pittsburgh and its institutions as a laboratory for learning. All students will be required to attend the field trip and will be expected to document the experience in your sketchbooks.

studio component: readings

Throughout the semester, every student will be asked to visit two web blogs on architecture:

www.archidose.blogspot.com and www.archinect.com

These websites will introduce you to the context of architecture, which you are now apart. Archinect has its own school blog section in which you can learn and communicate with other architecture school students throughout the world. Thoughts and discussions about these blogs are welcomed at the beginning of each lecture.

This semester, a few readings will be assigned. They will be available either online as a PDF or as an occasional book purchase through the campus bookstore.

studio component: studio website

www.andrew.cmu.edu/course/48-100/ will be the first year studio website and will have all assignments, due dates, calendar, and assigned readings.

first year faculty

| | | | |
|-------------------|-------------------------------------|-------------------------|-------------------------------------|
| Gerard Damiani | Studio Coordinator | gdamiani@andrew.cmu.edu | Office: Margaret Morrison, Room 307 |
| Jennifer Lucchino | Yellow Studio | lucchino@andrew.cmu.edu | |
| Mary-Lou Arscott | Yellow Studio | mlarscott@cmu.edu | |
| Sarah Drake | Red Studio | sdrake@andrew.cmu.edu | |
| Jason Morris | Red Studio | jlmorris@andrew.cmu.edu | |
| Teresa Bucco | Blue Studio | tbucco@andrew.cmu.edu | |
| Don Johnson | Blue Studio | dj2d@andrew.cmu.edu | |
| Scott Smith | Shop Director | ssbg@andrew.cmu.edu | |
| Doug Cooper | Drawing | dcooper@andrew.cmu.edu | |
| David Burns | Introduction to Digital Media (IDM) | dburns@andrew.cmu.edu | |
| Martin Aurand | Librarian / Archivist | ma1f@andrew.cmu.edu | |
| Christina Lynch | Teaching Assistant | clynch@andrew.cmu.edu | |

course dates | locations | times

| | | | |
|-----------------|-------|---|------------------------|
| Studio | M W F | Margaret Morrison Carnegie Hall (MMCH), 3rd Floor | 1:30 – 4:20 pm |
| Studio Lectures | W | MMCH, Breed Hall, Room 103, 1st Floor | 1:30 – 2:20 pm |
| Shop Sessions | W | College of Fine Arts (CFA) Shop, Lower Level | 1:30, 2:30, or 3:30 pm |

rules & requirements

important rules

1. The studio course is intended as a laboratory for learning, therefore on time attendance (including lectures) is required to gain knowledge. Lateness is disruptive, disrespectful, and unacceptable. Five minutes lateness to any studio activity is equal to an unexcused absence.
2. Sleeping during studio or lecture is equal to an unexcused absence.
3. Three unexcused absences will result in FAILING the course. There will be no exceptions.
4. Absence from any studio activity without a valid excuse will result in a grade reduction.
5. Deadlines - both interim and final presentation - are to be respected. Working past deadlines will result in a failing grade for the project.
6. Unfinished presentations at the time of the project review will NOT be presented to your peers and will receive a grade penalty commensurate with the degree of incompleteness. An adjustment of the grade may be considered if, upon agreement with the coordinator, the work is later completed for the final semester review.
7. To establish optimal work habits and conditions, there is to be NO eating, music, cell phones, trips to the art store, non-studio computer use in the studio during studio hours (1:30 - 4:20 pm, M W F) or during lectures. The studio is closed during class times for drawing and digital media.
8. You are expected to actively participate in all studio discussions and pin-ups. During times of in-studio desk crits, when waiting for your critique, you should either listen to your colleague's critique or work quietly on your own work until your own critique. Unrelated conversations are considered disrespectful to your colleague's and professor's crit time.
9. FORBIDDEN: drawing or cutting on the desks, floors, or walls; or otherwise defacing school property will not be tolerated; spraymount or spray-paint is strictly prohibited from all areas of Margaret Morrison or its surroundings; dragging tables across the hardwood floors is prohibited. Any violators of these rules is to be brought to the immediate attention of the coordinator and will result in loss of personal crit time and / or fines.

attendance

Design studio is the backbone of your architectural education. As a result, all students are required to attend *every* studio, lecture, shop session, or other studio activity. If you cannot make it to studio, always notify your instructor *in advance*. A visit to the nurse's or doctor's office is NOT considered an "excused" absence. More than three absences (excused or un-excused) can result in automatic failure of the course. You are expected to be on time for the start of studio at 1:30 pm and stay in studio throughout the end of studio at 4:20 pm, or longer for mid and final reviews or if your instructor requires it (except for approved extra-curricular activities). Lateness, excessive coming-and-going, and leaving early are disruptive, disrespectful, and unacceptable.

space

Your foremost intention as an architect is to create space that will improve the human condition. The studio environment is no exception. You are expected to make (and maintain) the studios as the best possible place for exploration and expressing architectural ideas. Keep the studios neat, clean, and professional looking. Clean up the space around you regularly. Share the space, desks, and wall space with your colleagues.

evaluation

documents

As evidence of your process and to reveal areas where you may need assistance, you will be required to keep:

1. A sketchbook
2. A three-ring binder with studio hand-outs
3. All process drawings and study models
4. All final drawings and models

As mentioned before, the sketchbook should be a dedicated journal for ideas related to the studio experience, having a significant number of drawings of various projections, scales, and complexity. A notebook should contain studio and shop hand-outs, assignments and crit sheets. All process as well as final drawings and models should be dated and annotated for mid and final semester grading. The drawings should be contained within either a large, self-made chipboard folio or a purchased portfolio.

project documentation

As part of an effort to record your work, all students will be required to create well designed project documentation sheets using the prescribed template provided by the School of Architecture. This process will be initiated as part of the Introduction to Digital Media (IDM) course. This documentation process will continue throughout the five years of the program. In addition, each student is required to maintain a personal website as part of the IDM course.

course evaluation

All students are required to complete an on-line faculty course evaluation between November 21st and December 10th.

grading

In your past academic experience, evaluation of your work was the responsibility of the teacher. The requirements were stated and your grade was determined by how well your work fulfilled the requirements. This was fairly straight forward as the answers to the questions were known beforehand, most often they were easily quantifiable, and generally there was only one, or at the very least, a limited number of answers. This description of circumstances as it applies to architecture is not as easy.

Architecture is indeed an endeavor that is comprised of questions that one searches for answers, which you will learn through study. As architects, what we know and what we do not know drives us to speculate, to formulate, and to construct new answers. You will learn to make evaluations of your own work by comparing it to your colleague’s work, through critiques with your professors, and by continuing to expand your knowledge of the subject. This is not an easy thing to do. For criticism to be productive, you must realize that the work is the point of the criticism, not the person. Although this is difficult, we will ask you to begin this process immediately.

Your solutions to each assignment will be evaluated on the strength of idea, degree of challenge, and level of complexity. Your ideas should show evidence of applying a broad range of resources to inform the quality of your solution. Your work should also show evidence of knowledge gained from within the studio as well as other co-requisite courses and cultural events. Exceptional work is built upon a synthesis of previous knowledge, not only the studio assignment.

Grades will be assigned based on problem comprehension and definition, self-direction in response to criticism, commitment to imaginative exploration and problem-solving, dedication to refinement, and communication in terms of graphic and verbal resolution.

Grades will be determined on three levels:

1. Relative to your individual standards, potential, and improvement
2. Relative to the entire studio in response to its specific goals and assignments
3. Relative to the mastery of methods, participation in and application of studio discussions, and lecture material of the first year

grade sheets

You will receive periodic written evaluations to document your attitude, effort, process, progress, and results. Their purpose is to minimize confusion and ambiguity. Be honest with yourself. If you have doubts about how well you are doing ask your instructor, come see the coordinator, and / or go find help with advisors, beginning with Heather Workinger in CFA 201.

grade distribution

According to departmental policy, your studio instructor is responsible for assigning the majority of your grade, and will be focused on the “process” (this includes sketchbooks, studio exercises, studio participation, mastery of methods, and willingness to explore the subject), but will also be asked to assign a final “product” grade. The coordinator, who is responsible for the pedagogy of the entire studio, will assign a grade for juried projects that includes both process and product, and will seek the advice of the other instructors, other School faculty, as well as outside critics. The final grade will be weighted as follows:

| | |
|--------------------|------------------------|
| Studio Assignments | 65% |
| Shop Assignments | 20% |
| Sketchbook | 10% (5% mid, 5% final) |
| Semester Review | 05% |

The mid-term grade will be a statement about progress and promise, based upon the work produced up to that date.

| | | | | | | | | | | | |
|----|------|--------|----|------|--------|----|------|--------|----|------|--------|
| A | 4.00 | 93.2 % | B+ | 3.25 | 80.0 % | C+ | 2.25 | 60.0 % | D+ | 1.25 | 40.0 % |
| A- | 3.75 | 86.6 % | B | 3.00 | 73.2 % | C | 2.00 | 53.2 % | D | 1.00 | 33.2 % |
| | | | B- | 2.75 | 66.8 % | C- | 1.75 | 46.8 % | D- | 0.75 | 26.8 % |
| | | | | | | | | | R | 0.00 | 00.0 % |

standards

A | Superlative or exemplary work.

Initiative beyond the description of the problem. Significant understanding of the problem. Conceptual clarity. Attended by an attitude of self-motivated exploration, open-mindedness, and a willingness to benefit from criticism.

B | Very good

Convincing development and comprehensive resolution, some exemplary work. A thorough understanding of the problem. Project displays conceptual foundation and is well-crafted. Competence and mastery of skills. Open, inquisitive attitude.

C | Satisfactory

Consideration of alternatives in the resolution of the project. Adequate work which meets the minimum requirements of the problem and course. Shows understanding of the problem, with some deficiencies. Reasonable mastery of skill and concepts. This grade represents the average solution.

D | Passing

Consideration of factual knowledge and complete presentation. Work which is complete but does not show an understanding of the problem or expectations and demonstrates deficient skills. Work often attended with closed-minded attitude with respect to criticism and self-motivation. Although technically passing, this work is unacceptable in a professional program.

R | Repeat

Unsatisfactory work that does not meet the requirements of the problem or course. Shows a serious deficiency in skills or is incomplete. Raises questions with respect to the future success within the program.

special needs

Students with any documented medical, psychological, or learning condition that requires special room accommodations should see the coordinator as soon as possible so we can make the appropriate arrangements. In the event of any emergency or other special situation, please contact the coordinator as soon as possible so we can make arrangements with respect to studio.

schedule (08.27.07)

| | | | | STUDIO PROJECTS | LECTURE / SHOP | OTHER EVENTS / DATES |
|---------------|----|---------|----|--|---|--|
| week 1 | | 27 Aug | M | All school meeting @ McConomy 1:30 | | |
| | 1 | 29 Aug | W | Project 1 assigned/due | LECTURE 01 | |
| | 2 | 31 Aug | F | Project 2 assigned/due | | I Scream & Study Abroad Exhibit 4:30 pm Nakashima & Briggs Gallery Openings 5:00 pm |
| week 2 | | 03 Sept | M | NO STUDIO Labor Day | | |
| | 3 | 05 Sept | W | Project 3 | Shop Session 01 | |
| | 4 | 07 Sept | F | " " | 1:30 - 2:20 B1 / Y2 2:30 - 3:20 Y1 / R2 3:30 - 4:20 R1 / B2 | |
| week 3 | | 10 Sept | M | Project 3 Due | | |
| | 6 | 12 Sept | W | Project 4 | Shop Session 02 | |
| | 7 | 14 Sept | F | " " | 1:30 - 2:20 B1 / Y2 2:30 - 3:20 Y1 / R2 3:30 - 4:20 R1 / B2 | |
| week 4 | | 17 Sept | M | Project 4 Due | | |
| | 9 | 19 Sept | W | Project 5 | LECTURE 02 | |
| | 10 | 21 Sept | F | " " | | |
| week 5 | | 24 Sept | M | Project 5 Due / 6 assigned | | |
| | 12 | 25 Sept | T | | | Drawing Portfolio Due |
| | 13 | 26 Sept | W | Project 6 Due | Shop Session 03 | |
| | 14 | 28 Sept | F | Project 7 | 1:30 - 2:20 B1 / Y2 2:30 - 3:20 Y1 / R2 3:30 - 4:20 R1 / B2 | |
| week 6 | | 01 Oct | M | " " | | |
| | 16 | 03 Oct | W | Project 7 Due | Library Orientation | |
| | 17 | 05 Oct | F | Project 8 | 1:30 - 2:20 B1 / Y2 2:30 - 3:20 Y1 / R2 3:30 - 4:20 R1 / B2 | Pittsburgh Field Trip |
| | | 06 Oct | Sa | | | |
| week 7 | | 08 Oct | M | " " | | |
| | 19 | 10 Oct | W | Project 8 Due | Shop Session 04 | Lecture: Greg Lynn 6:30 pm TBA Shop: Box Construction Due |
| | 20 | 12 Oct | F | Project 9 | 1:30 - 2:20 B1 / Y2 2:30 - 3:20 Y1 / R2 3:30 - 4:20 R1 / B2 | |
| week 8 | | 15 Oct | M | " " | | |
| | 22 | 17 Oct | W | Project 9 Due | LECTURE 03 | Lecture: Anthony Burke 6:30 pm TBA |
| | | 19 Oct | F | NO STUDIO Mid-Semester Break | | |

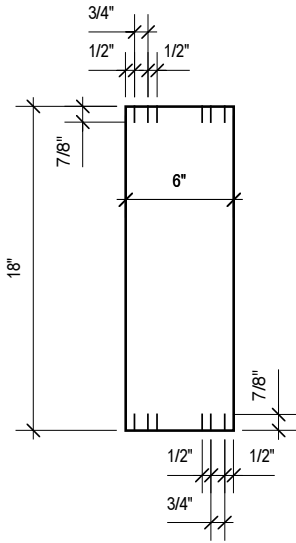
schedule (cont.)

| | | | | STUDIO PROJECTS | LECTURE / SHOP | OTHER EVENTS / DATES |
|----------------|----|-----------|----|---|---|---|
| week 9 | 23 | 22 Oct | M | Project 10 | | |
| | 24 | 24 Oct | W | Project 10 Due | Shop Session 05 | Shop: Slots & Extensions Due |
| | | 25 Oct | Th | | 1:30 - 2:20 B1 / Y2 | Homecoming Oct 25-27 |
| | 25 | 26 Oct | F | Project 11 | 2:30 - 3:20 Y1 / R2 3:30 - 4:20 R1 / B2 | |
| week 10 | 26 | 29 Oct | M | " " | | |
| | 27 | 30 Oct | T | | | Drawing Portfolio Due |
| | 28 | 31 Oct | W | Project 11 Due | LECTURE 04 | |
| | 29 | 02 Nov | F | Project 12 | | Course Drop Deadline Parents Weekend Nov 3-5 |
| week 11 | 30 | 05 Nov | M | " " | | Lecture: Hank Dittmar 6:30 pm CMOA |
| | 31 | 07 Nov | W | " " | Shop Session 06 | Shop: Planes Due |
| | 32 | 09 Nov | F | " " | 1:30 - 2:20 B1 / Y2 2:30 - 3:20 Y1 / R2 3:30 - 4:20 R1 / B2 | |
| week 12 | 33 | 12 Nov | M | Project 12 Due | | |
| | 34 | 14 Nov | W | Project 13 | LECTURE 05 | |
| | 35 | 16 Nov | F | " " | | |
| week 13 | 36 | 19 Nov | M | " " | | Shop: Holes & Finishes Due |
| | | 21 Nov | W | NO STUDIO Thanksgiving | STUDIO CLOSED | 20 Nov 10:00 pm closed |
| | | 23 Nov | F | NO STUDIO Thanksgiving | STUDIO CLOSED | 25 Nov 12 noon re-open |
| week 14 | 37 | 26 Nov | M | Final Presentation Dwgs | | |
| | 38 | 28 Nov | W | Final Presentation Dwgs | LECTURE 06 | |
| | 39 | 30 Nov | F | Final Presentation Dwgs | | |
| | | 02 Dec | Su | Project 13 Due | | |
| week 15 | | 03 Dec | M | FINAL REVIEWS | | |
| | | 04 Dec | T | FINAL REVIEWS (evening) | | |
| | | 05 Dec | W | FINAL REVIEWS | | |
| | | 06 Dec | TH | | | Final Drawing Portfolio Due |
| | | 10 Dec | M | | | IDM CD Due |
| | | 12 Dec | W | Project Documentation Due | | |
| | | 14 Dec | F | SEMESTER REVIEW | | |
| | | 13-17 Dec | | STUDIO CLEAN-UP (studios must be returned to the condition of the first day) | | |

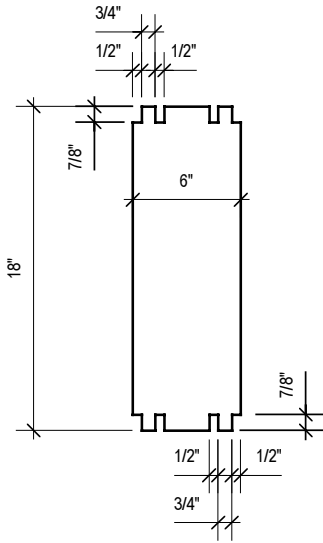
first year: Wood Fabrication Project

A volume of cubic space: Step One

| | |
|------------------|---|
| Issued | Wednesday, September 12, 2007 |
| Objective | This semester's project will be directly linked to the studio concepts learned throughout the semester. Ideas such as volume, implied spatial definition, hierarchy, cartesian axes, primary/ secondary spaces, composition, proportion, consistency and articulation will be explored in the development of a cubic volume of space. |
| Working Process: | <p>As part of your process you are to produce sketches, study models and mock-ups of all your potential design elements before you will be able to work in the shop. Expect to provide adequate forms of representation to the shop directors and monitors before starting any part of the fabrication process. Each Wednesday you will show your studio instructors how you will develop your cubic volume of space. Each design decision will be based on the skills you are learning in the shop demonstrations as well as the studio projects you are working on in the studio. This project is meant to feed off of your studio learning.</p> <p>You will be asked to make a cubic volume using a rough sawn poplar wood blank and your 2x4 supplied in project 4. These basic materials will evolve throughout the semester into a spatial cubic volume while also providing an interior series of spaces implied by cartesian planes, orthographic cuts, planar reliefs and circular subtractions.</p> |
| Step One: | The first step in your process will be to build an 18" x 18" x 6" frame (see the provided drawing attached). Conceptually you should consider this the physical context which all the actions that follow will rely on. Your later additions will respond to this context in a variety of ways. As you began to make decisions about your design, each step will further reinforce the spatiality of the cubic volume and the implied spaces within it. |
| Due | Wednesday, September 26, 2007 @ 1.30 p.m. |



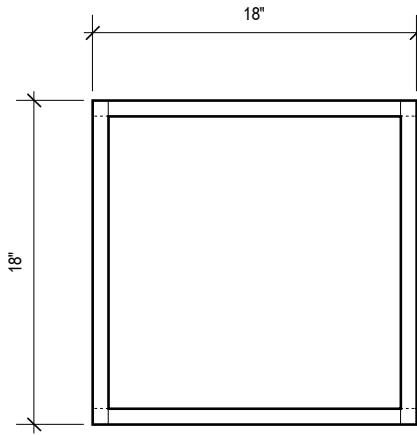
A: FIRST CUTS INTO PLANK
(2) REQUIRED



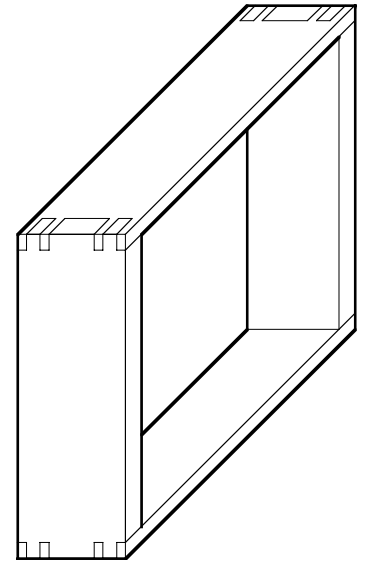
B: FIRST FINGER JOINT PATTERN
(2) REQUIRED



C: TRANSFER PART B ONTO THE OTHER TWO PIECES AND CUT
(2) REQUIRED



D: FRICTION FIT OF ALL (4) FOUR SURFACES
SIDE VIEW OR TOP VIEW



STEP ONE: PARALINE DRAWING OF THE COMPLETE ASSEMBLY

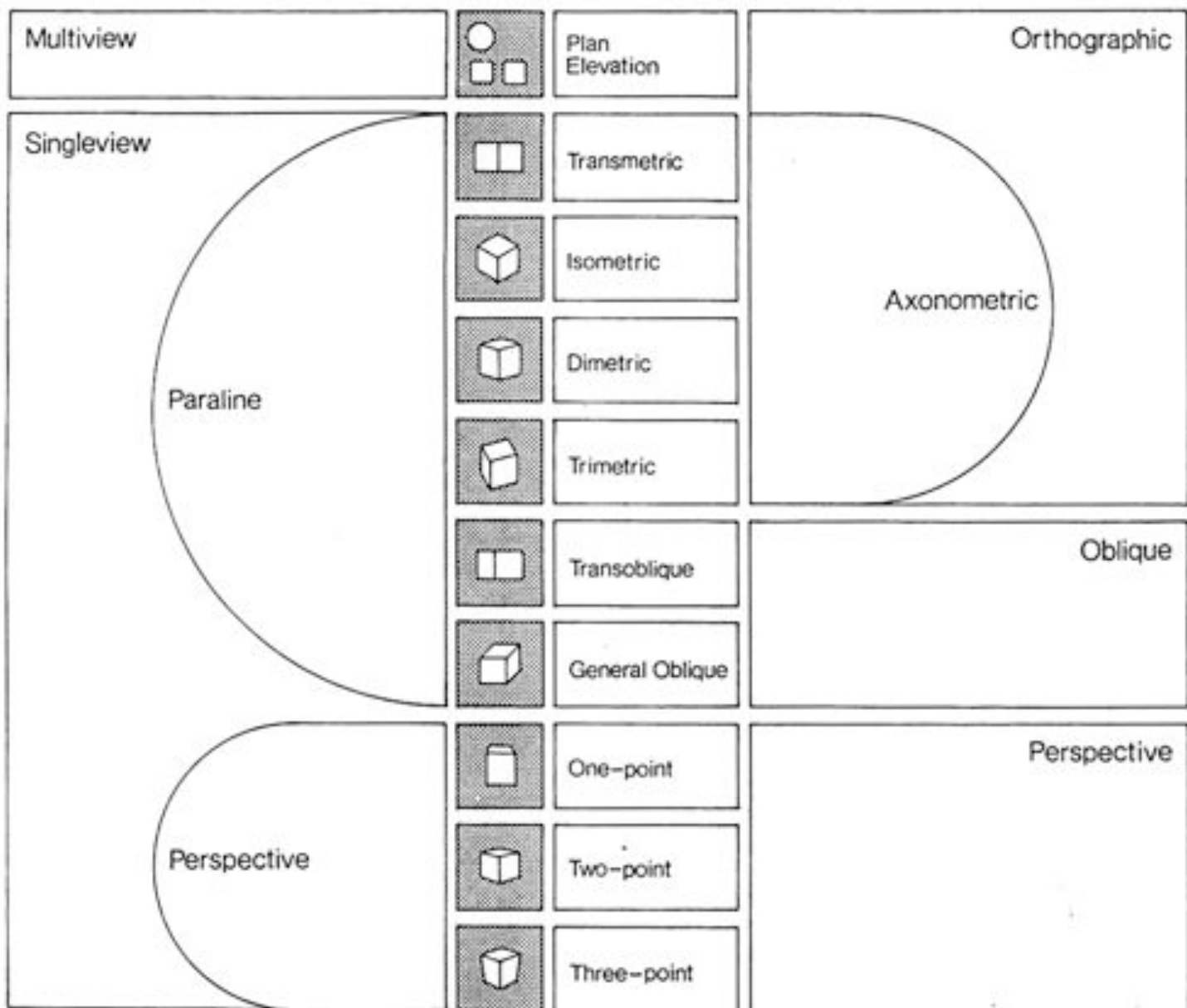
To Draw: to pull, to make, to delineate

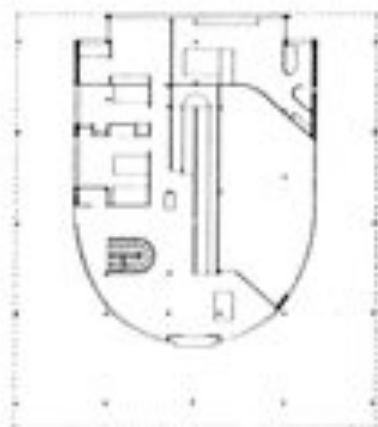
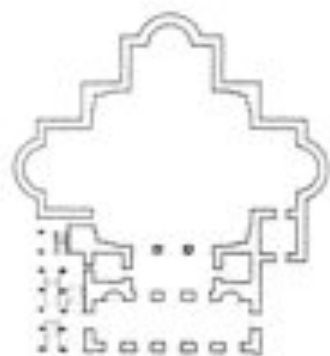
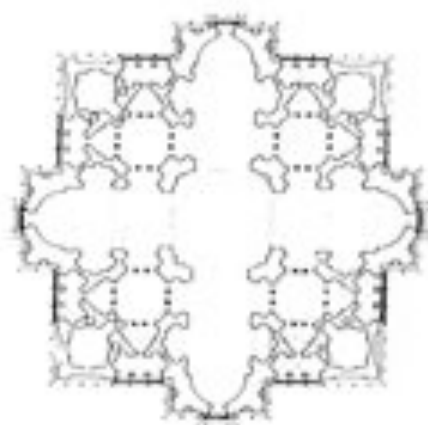
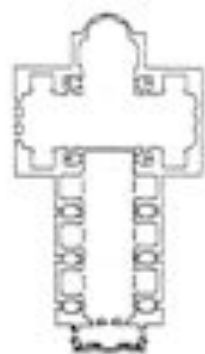
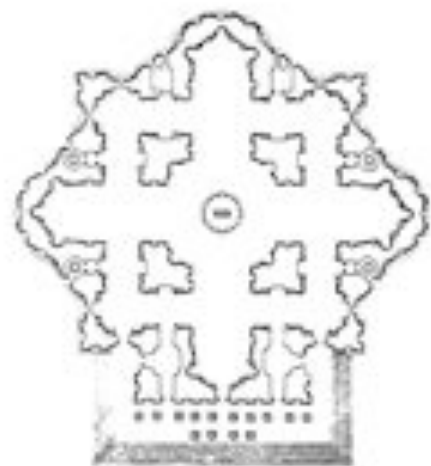
Vitruvius: “drawing (disegno) is the father of our three arts, Architecture, Sculpture, and Painting

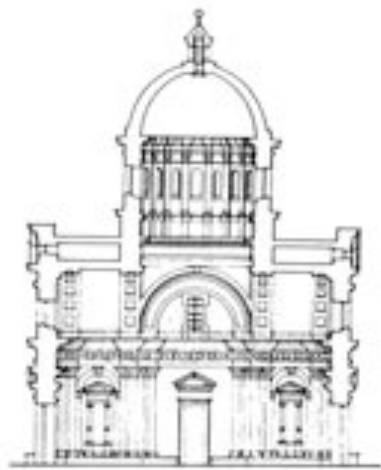
Vasari: “Drawing as an apparent expression, or a visible image of the thoughts of the mind (esprit) and of what one has formed first in the imagination.”

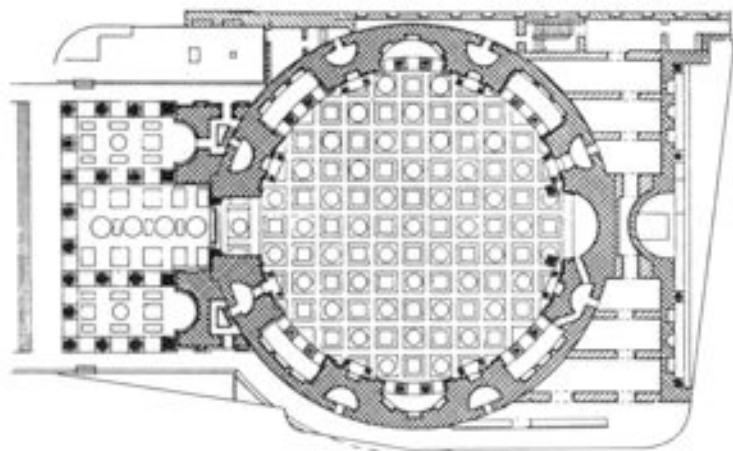
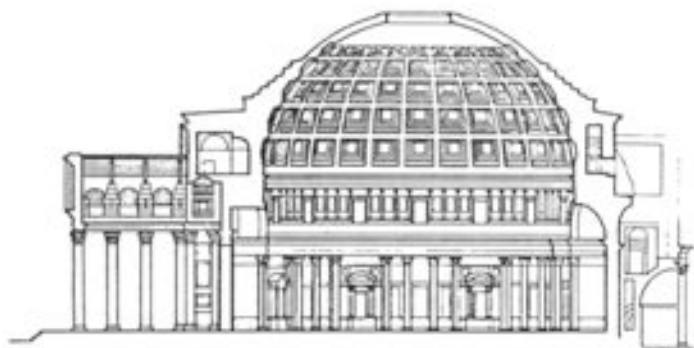
Pictorial Effect

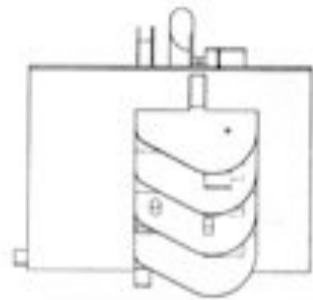
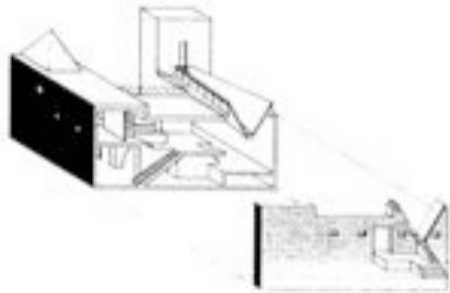
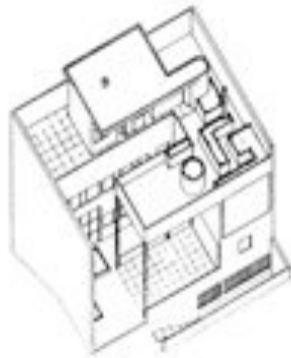
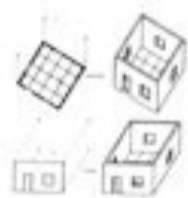
Projection System

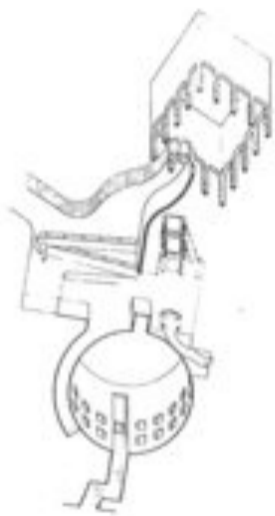
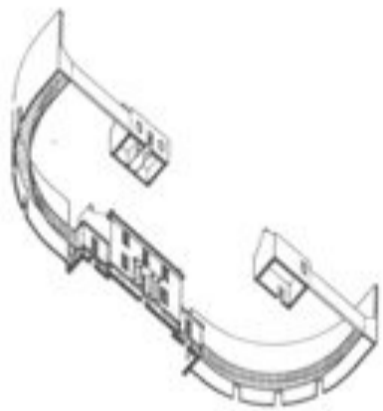














4H

- This dense grade of lead is best suited for accurately marking and laying out light construction lines.
- The thin, light lines are difficult to read and reproduce and should therefore not be used for finish drawings.
- When applied with too much pressure, the dense lead can engrave paper and board surfaces, leaving grooves that are difficult to remove.

2H

- This medium-hard lead is also used for laying out drawings and is the densest grade of lead suitable for finish drawings.
- 2H lines do not erase easily if drawn with a heavy hand.

F and H

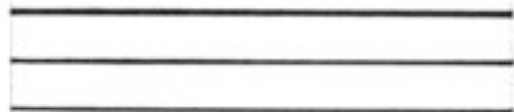
- These are general-purpose grades of lead suitable for layouts, finish drawings, and handlettering.

HB

- This relatively soft grade of lead is capable of dense linework and handlettering.
- HB lines erase and print well but tend to smear easily.
- Experience and good technique are required to control the quality of HB linework.

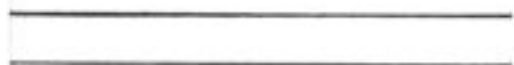
B

- This soft grade of lead is used for very dense linework and handlettering.



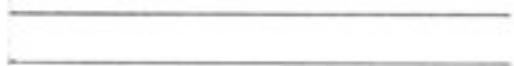
Heavy

- Heavy solid lines are used to delineate the profiles of plan and section cuts (see pages 42 and 58) as well as spatial edges (see page 81).
- H, F, HB, B
- Use a lead holder or draw a series of closely spaced lines with a 0.3 mm or 0.5 mm mechanical pencil; avoid using a 0.7 mm or 0.9 mm pencil for drawing heavy line weights.
- Pressing too hard to make a line means that you are using too hard of a lead.



Medium

- Mediumweight solid lines indicate the edges and intersections of planes.
- H, F, HB



Light

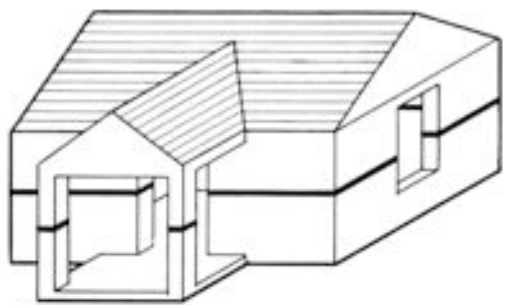
- Lightweight solid lines suggest a change in material, color, or texture, without a change in the form of an object.
- 2H, H, F



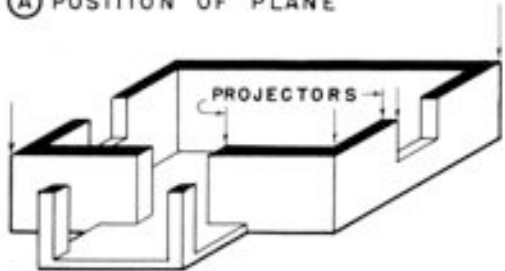
Very Light

- Very light solid lines are used to lay out drawings, establish organizing grids, and indicate surface textures.
- 4H, 2H, H, F

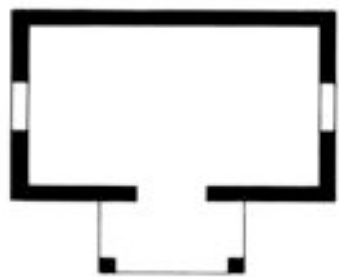
Construction of Multi-View Drawings



(A) POSITION OF PLANE

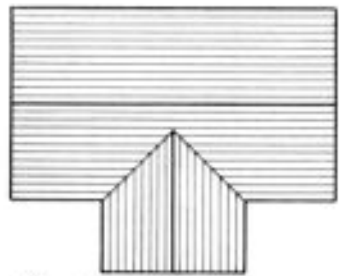


(B) TOP PART REMOVED



(C) PLAN OF REMAINDER

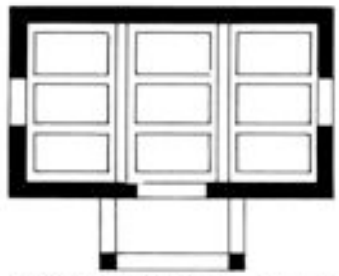
MAKING A FLOOR PLAN



(D) ROOF PLAN



(E) FRAMING PLAN



(F) REFLECTED PLAN

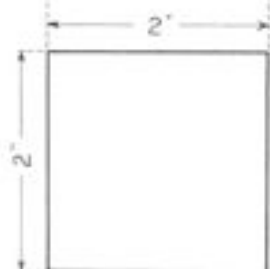
KINDS OF PLANS

CUBE

FIG. 1.

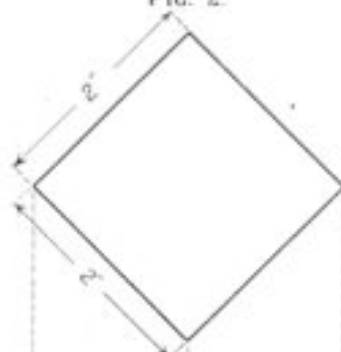


TOP VIEW



FRONT VIEW

FIG. 2.

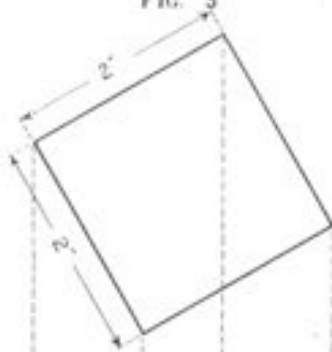


TOP VIEW



FRONT VIEW

FIG. 3.



TOP VIEW



FRONT VIEW

FIG. 1.

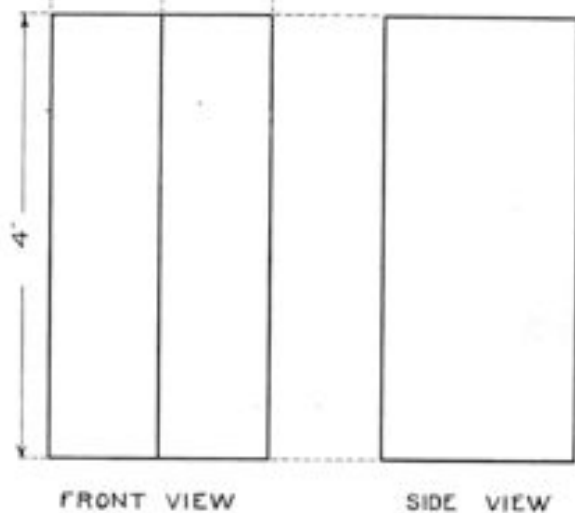
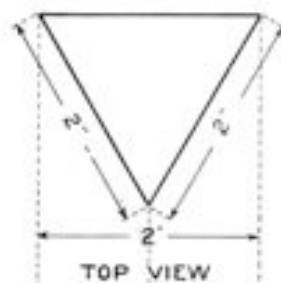
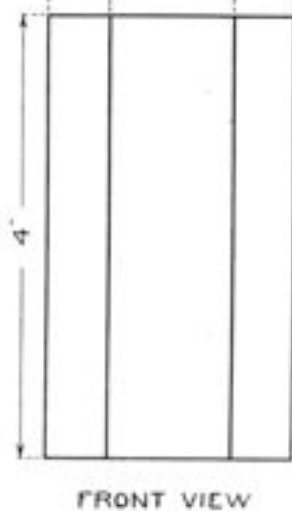
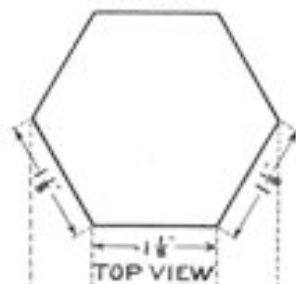
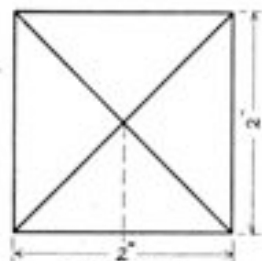
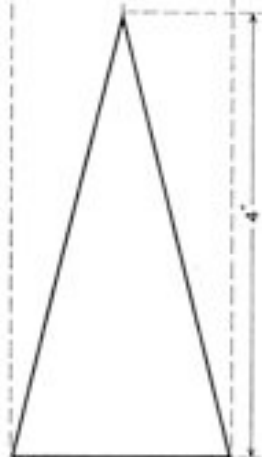
TRIANGULAR
AND
HEXAGONAL PRISMS

FIG. 2.



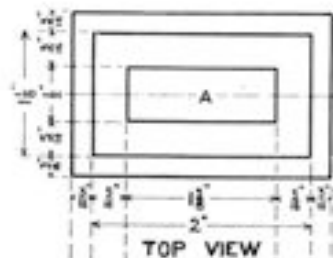


TOP VIEW

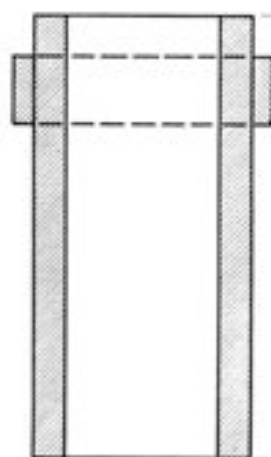


FRONT VIEW

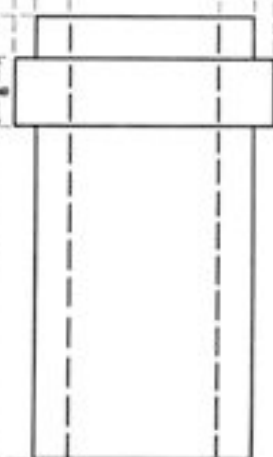
SQUARE PYRAMID
AND
CHIMNEY MODEL



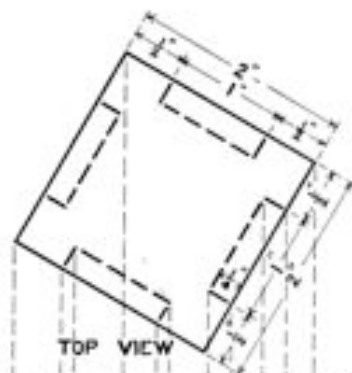
TOP VIEW



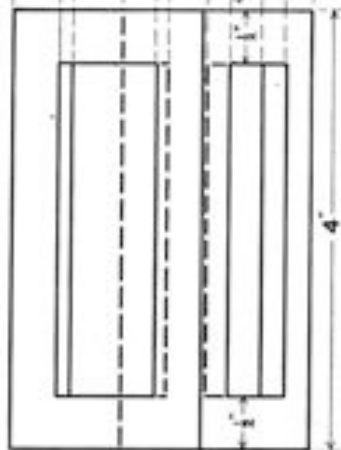
SECTION



FRONT VIEW



TOP VIEW

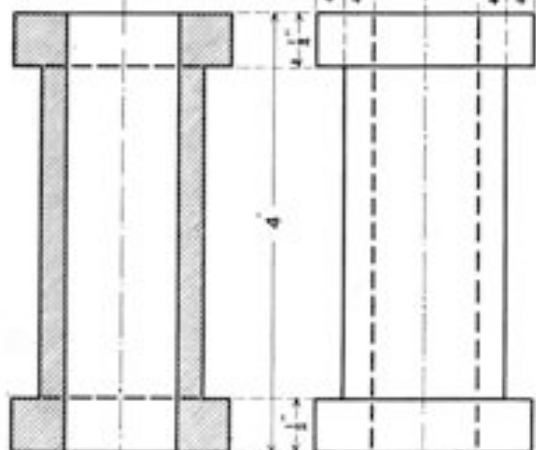
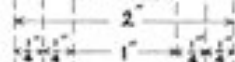


FRONT VIEW

SQUARE PRISM
AND
HOLLOW CYLINDER



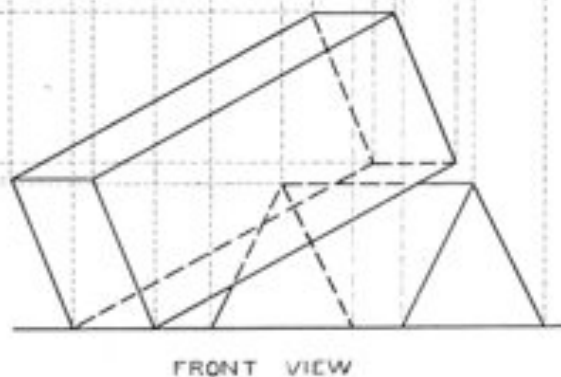
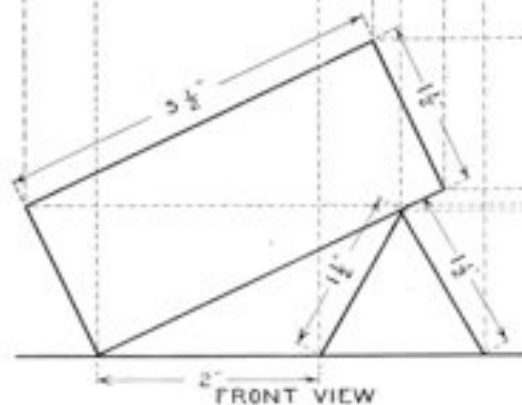
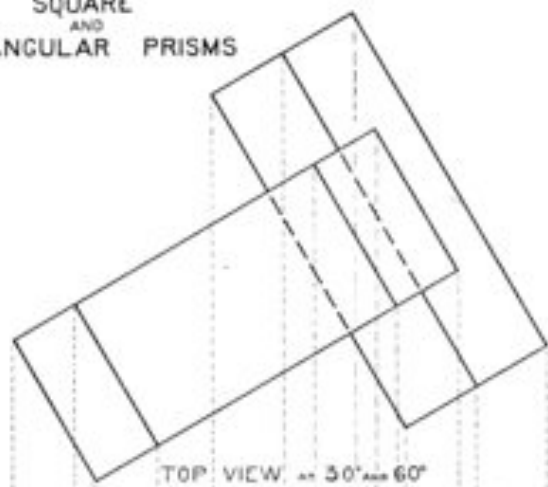
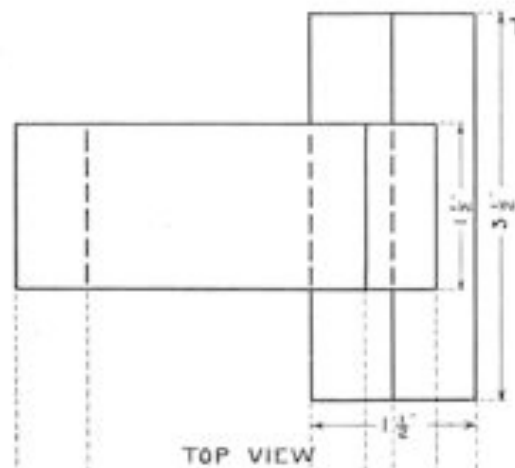
TOP VIEW

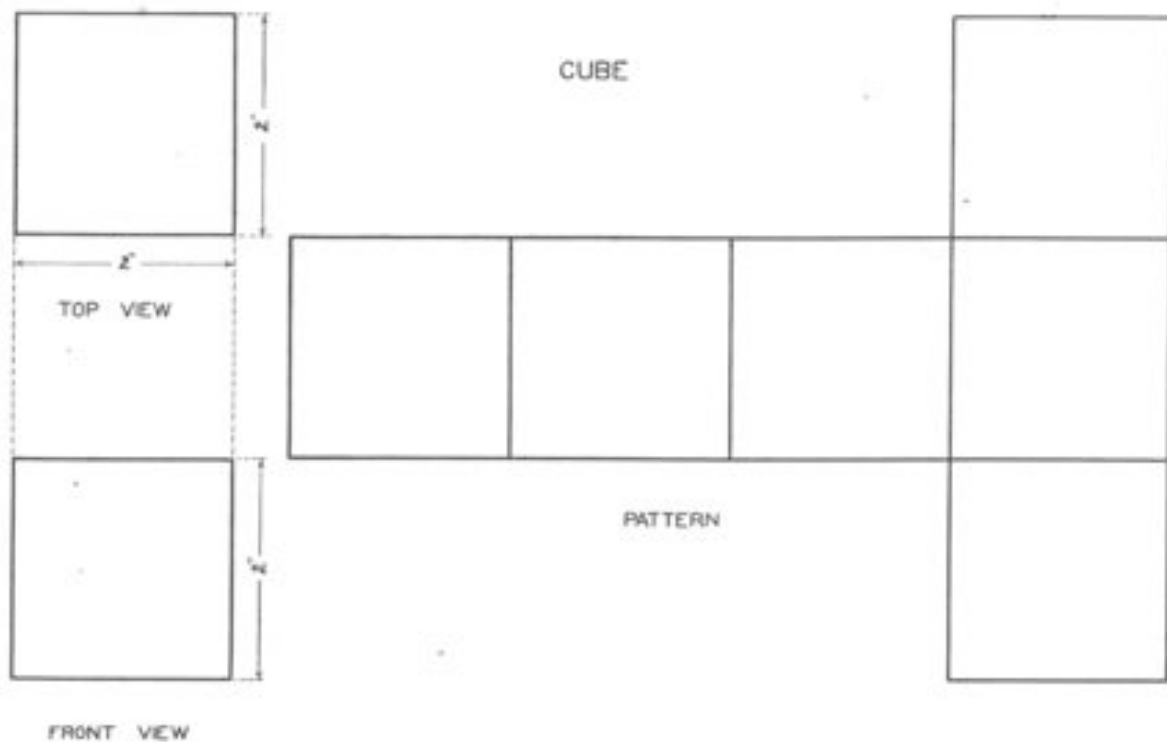


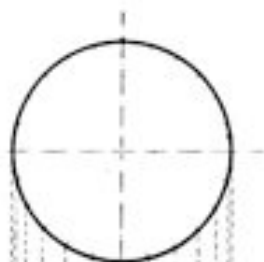
SECTION

FRONT VIEW

SQUARE
AND
TRIANGULAR PRISMS







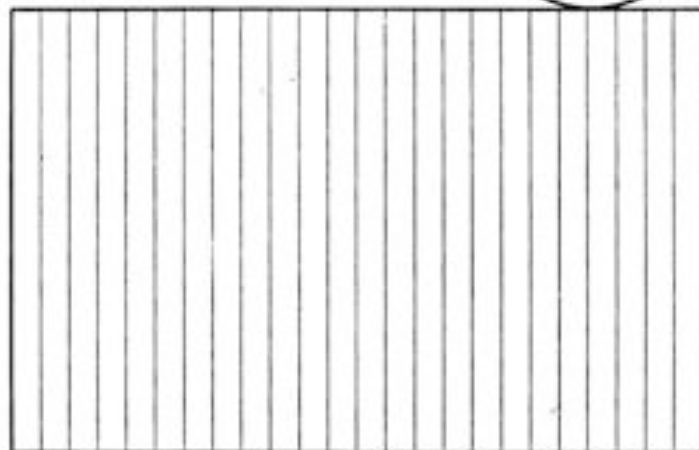
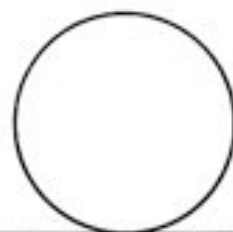
TOP VIEW

2"

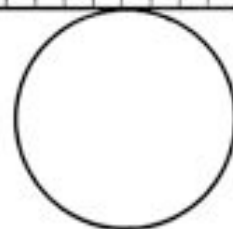


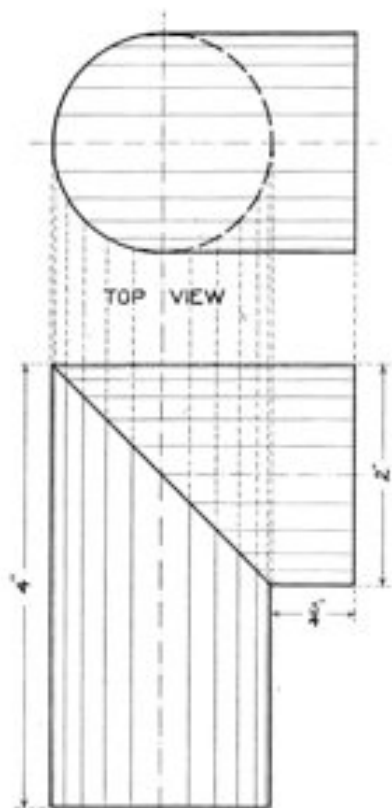
FRONT VIEW

CYLINDER



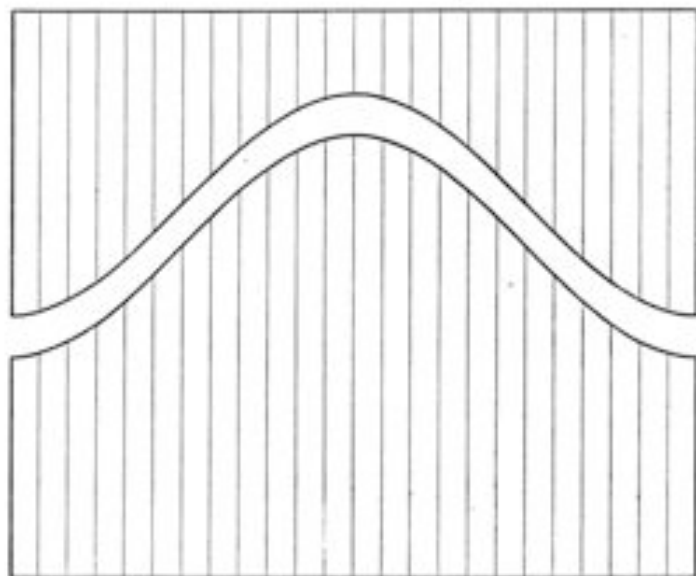
PATTERN



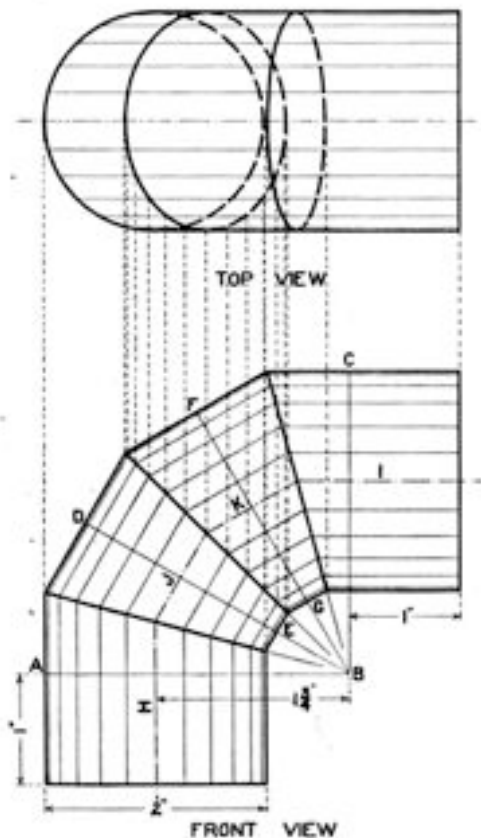


FRONT VIEW

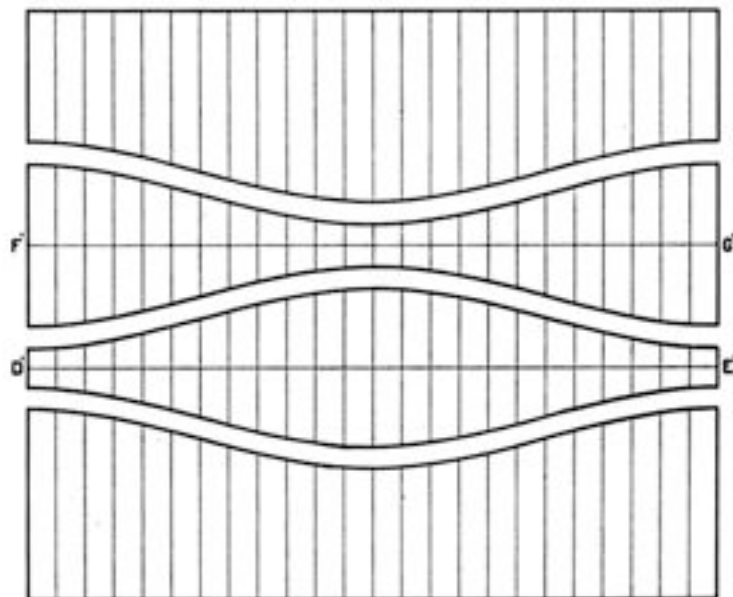
RIGHT ELBOW



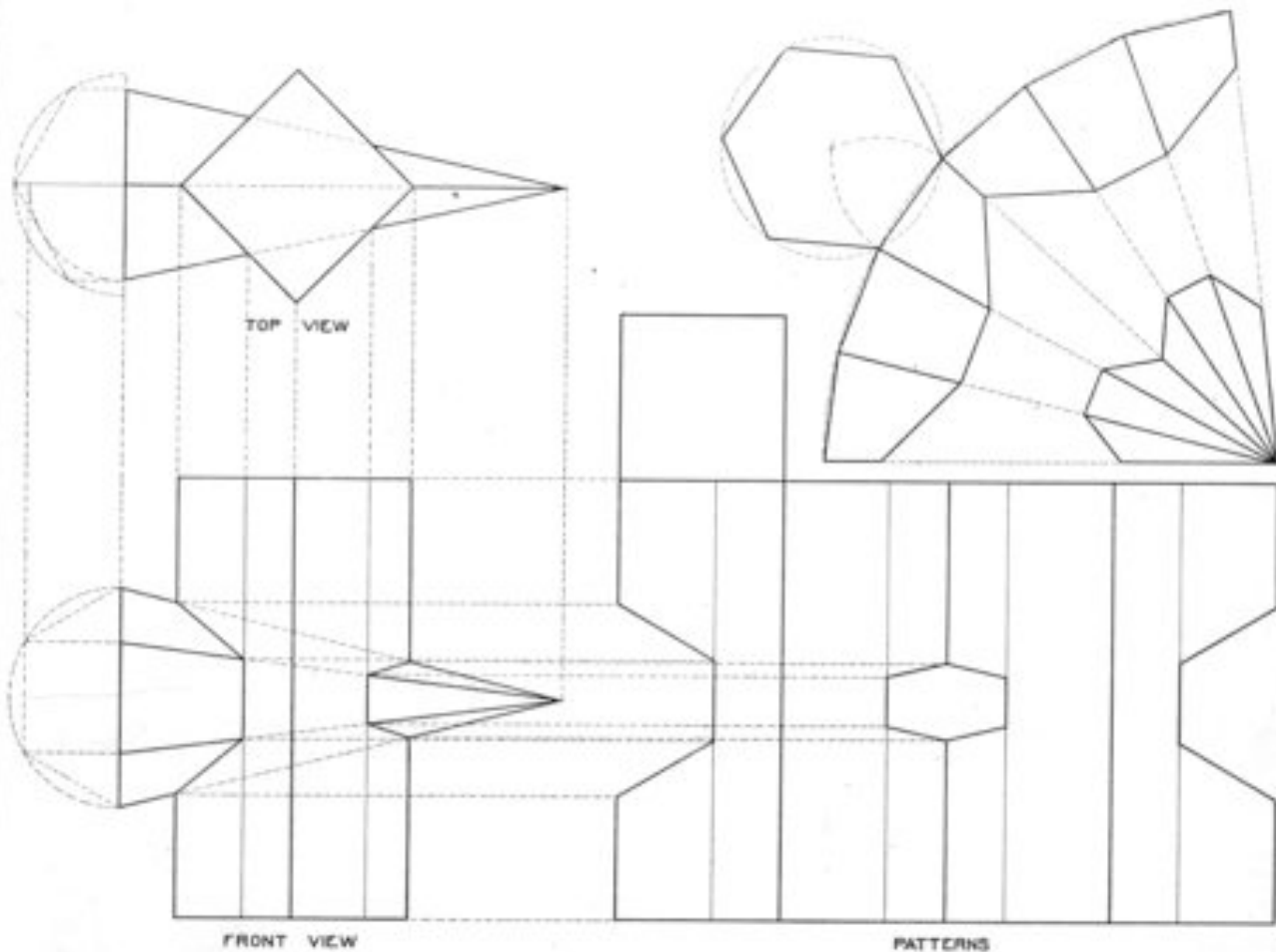
PATTERN

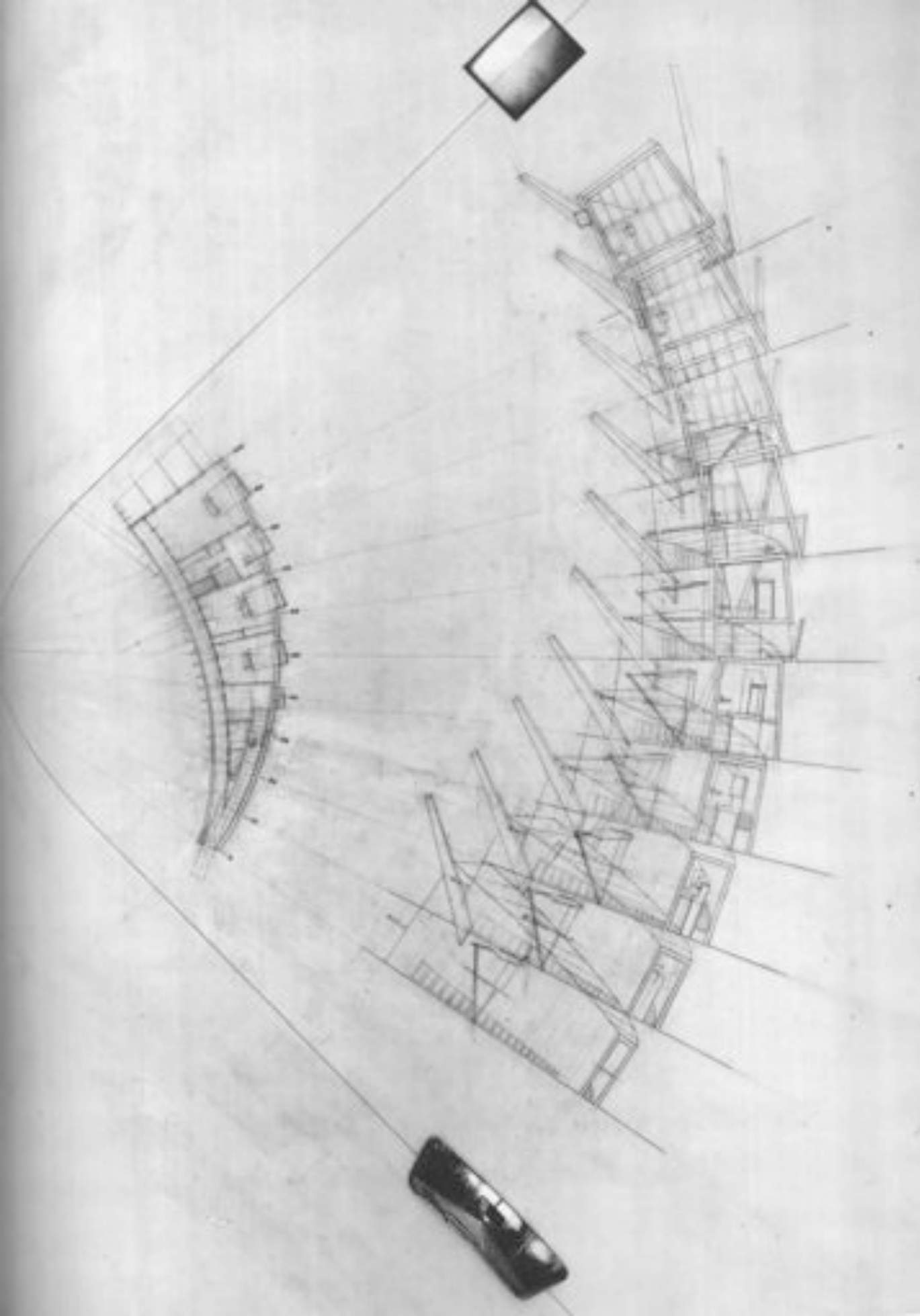


FOUR PART ELBOW



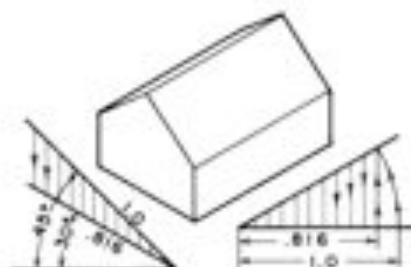
PATTERN



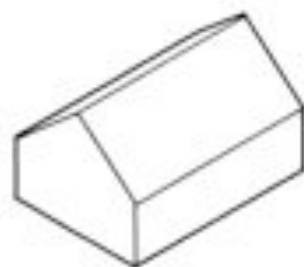




(A) ISOMETRIC AXES

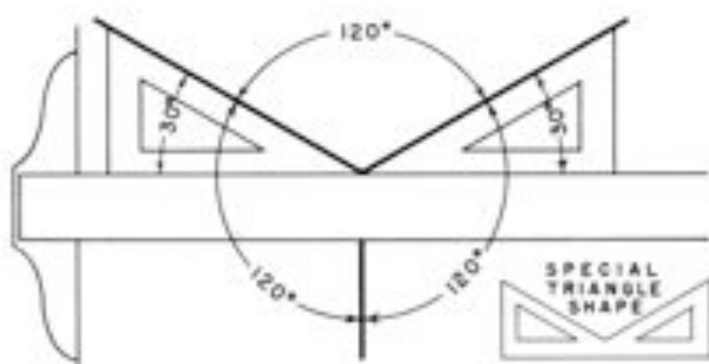


(B) ISOMETRIC PROJECTION



(C) ISOMETRIC DRAWING

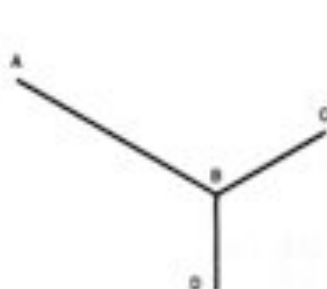
ISOMETRIC PROJECTION AND DRAWING



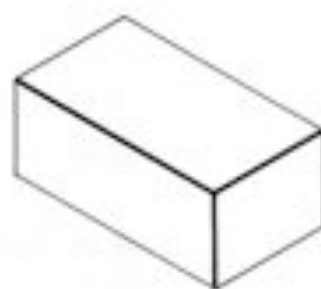
(D) THE ISOMETRIC ANGLES AND AXES



(E) MULTI-VIEW DRAWINGS



(F) AXES LOCATED



(G) OBJECT DRAWN

MAKING AN ISOMETRIC DRAWING



(H) ONE AXIS VERTICAL



(I)



(J) ONE AXIS HORIZONTAL



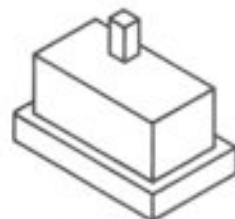
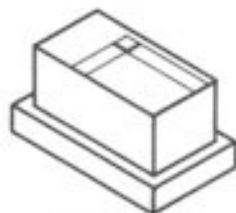
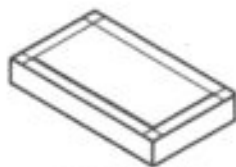
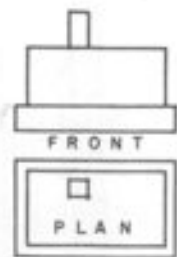
(K)



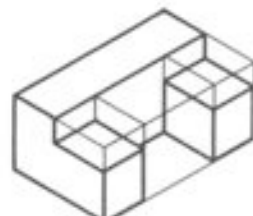
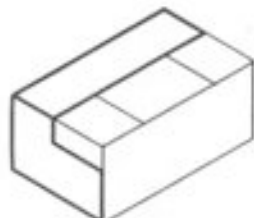
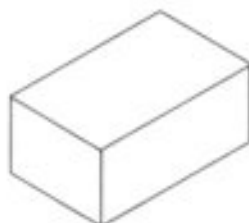
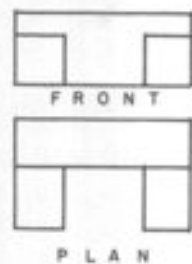
(L) INCLINED

POSITIONS OF THE ISOMETRIC AXES

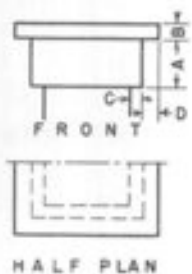
Isometric Drawing



THE OFFSET METHOD

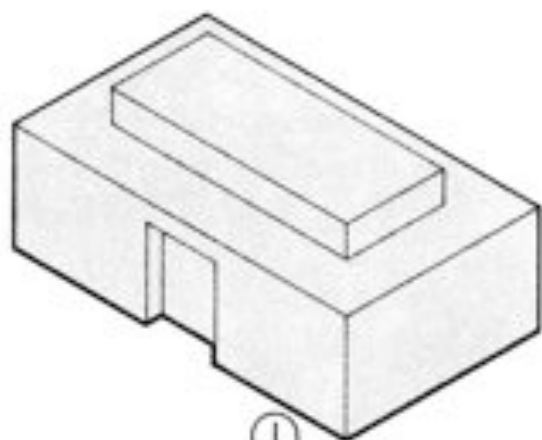


THE BOX METHOD

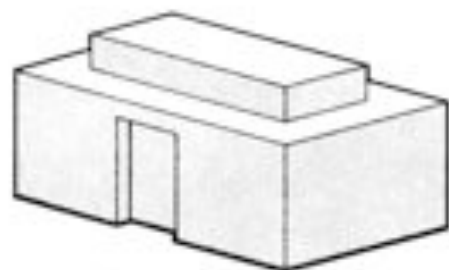


LOOKING UP
THE SECTION METHOD

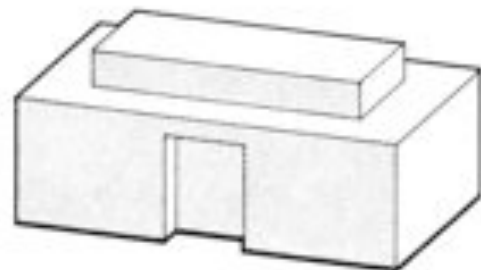
FIG-14 ISOMETRIC CONSTRUCTION METHODS



ISOMETRIC DRAWING
ALL AREAS EMPHASISED EQUALLY

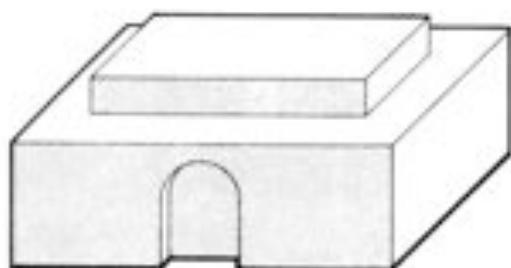


SYMMETRICAL



UNSYMMETRICAL

DIMETRIC DRAWING
EMPHASISED AREAS ARE SHADED



ELEVATION OBLIQUE



PLAN OBLIQUE

OBLIQUE DRAWING
TRUE SHAPE AREAS EMPHASISED AND SHADED

